08/302241
attachment to
Paper # 29

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=> s glutamine synthetase?
          6285 GLUTAMINE
          2001 SYNTHETASE?
L1          92 GLUTAMINE SYNTHETASE?
                 (GLUTAMINE(W)SYNTHETASE?)
=> s l1 and amplif?

        209654 AMPLIF?
L2          35 L1 AND AMPLIF?
=> d l2,1-35,cit,ti
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1. 5,516,652, May 14, 1996, DNA encoding prostaglandin receptor IP; Mark Abramovitz, et al., 435/69.1, 240.1, 240.2, 252.3, 254.11, 320.1; 530/350; 536/23.1 [IMAGE AVAILABLE]

US PAT NO: 5,516,652 [IMAGE AVAILABLE] L2: 1 of 35
TITLE: DNA encoding prostaglandin receptor IP

2. 5,500,361, Mar. 19, 1996, .beta.-ketoacyl-ACP synthetase II genes from plants; Anthony J. Kinney, 435/172.3, 69.1, 71.1, 240.4; 536/23.6; 800/205, 250, 255, DIG.69 [IMAGE AVAILABLE]

US PAT NO: 5,500,361 [IMAGE AVAILABLE] L2: 2 of 35
TITLE: .beta.-ketoacyl-ACP synthetase II genes from plants

3. 5,496,934, Mar. 5, 1996, Nucleic acids encoding a cellulose binding domain; Oded Shoseyov, et al., 536/23.7; 435/252.3, 320.1; 536/23.1, 24.33 [IMAGE AVAILABLE]

US PAT NO: 5,496,934 [IMAGE AVAILABLE] L2: 3 of 35
TITLE: Nucleic acids encoding a cellulose binding domain

4. 5,495,007, Feb. 27, 1996, Phloem-specific promoter; Gary A. Thompson, et al., 536/24.1; 435/172.3, 320.1; 536/23.6; 800/205; 935/35 [IMAGE AVAILABLE]

US PAT NO: 5,495,007 [IMAGE AVAILABLE] L2: 4 of 35
TITLE: Phloem-specific promoter

5. 5,468,845, Nov. 21, 1995, Antibodies to osteogenic proteins; Hermann Oppermann, et al., 530/387.9, 350 [IMAGE AVAILABLE]

US PAT NO: 5,468,845 [IMAGE AVAILABLE] L2: 5 of 35
TITLE: Antibodies to osteogenic proteins

6. 5,464,937, Nov. 7, 1995, Type II Interleukin-1 receptors; John E. Sims, et al., 530/350 [IMAGE AVAILABLE]

US PAT NO: 5,464,937 [IMAGE AVAILABLE] L2: 6 of 35
TITLE: Type II Interleukin-1 receptors

7. 5,457,182, Oct. 10, 1995, FK-506 cytosolic binding protein, FKBP12.6; Gregory J. Wiederrecht, et al., 530/402; 435/7.8, 69.1, 233; 530/350, 413 [IMAGE AVAILABLE]

US PAT NO: 5,457,182 [IMAGE AVAILABLE] L2: 7 of 35
TITLE: FK-506 cytosolic binding protein, FKBP12.6

8. 5,447,913, Sep. 5, 1995, Therapeutic uses of bactericidal/permeability-increasing protein dimer products; William S. Ammons, et al., 514/12, 21; 530/350 [IMAGE AVAILABLE]

US PAT NO: 5,447,913 [IMAGE AVAILABLE] L2: 8 of 35
TITLE: Therapeutic uses of bactericidal/permeability-increasing protein dimer products

9. 5,427,940, Jun. 27, 1995, Engineered cells producing insulin in response to glucose; Christopher B. Newgard, 435/240.2; 424/520; 435/4, 6, 69.1, 172.1, 172.2, 172.3, 320.1; 530/303, 350, 389.2, 397 [IMAGE AVAILABLE]

US PAT NO: 5,427,940 [IMAGE AVAILABLE] L2: 9 of 35
TITLE: Engineered cells producing insulin in response to glucose

10. 5,420,247, May 30, 1995, Leukemia inhibitory factor receptors and fusion proteins; David P. Gearing, et al., 530/350, 387.3, 388.23, 391.1, 402; 536/23.51 [IMAGE AVAILABLE]

US PAT NO: 5,420,247 [IMAGE AVAILABLE] L2: 10 of 35
TITLE: Leukemia inhibitory factor receptors and fusion proteins

11. 5,420,019, May 30, 1995, Stable bactericidal/permeability-increasing protein muteins; Georgia Theofan, et al., 435/69.1, 252.3, 320.1; 530/350; 536/23.5 [IMAGE AVAILABLE]

US PAT NO: 5,420,019 [IMAGE AVAILABLE] L2: 11 of 35
TITLE: Stable bactericidal/permeability-increasing protein muteins

12. 5,395,760, Mar. 7, 1995, DNA encoding tumor necrosis factor-.alpha. and -.beta. receptors; Craig A. Smith, et al., 435/240.1; 424/85.1; 435/69.4, 172.3; 530/351, 388.23; 536/23.51 [IMAGE AVAILABLE]

US PAT NO: 5,395,760 [IMAGE AVAILABLE] L2: 12 of 35

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      S1     4853  GLUTAMINE SYNTHETASE
?s s1 and recombinant?

          4853  S1
        263414  RECOMBINANT?
      S2     58  S1 AND RECOMBINANT?
?s s2 and amplif?

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Processing
            58  S2
        146528  AMPLIF?
      S3      5  S2 AND AMPLIF?
?d s3/3/1-5

      Display 3/3/1     (Item 1 from file: 144)

  10107619   PASCAL No.: 92-0313238
  High-level expression of a recombinant antibody from myeloma cells using
a glutamine synthetase gene as an amplifiable selectable marker
  BEBBINGTON C R; RENNER G; THOMSON S; KING D; ABRAMS D; YARRANTON G T
  Celltech Ltd, Slough SL1 4EN, United Kingdom
  Journal: Bio/technology - Nature Publishing Company,  1992, 10 (2)
169-175
  Language: English

                                - end of record -
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      Display 3/3/2     (Item 1 from file: 434)

11349785   Genuine Article#: HC298   No. References: 23
Title: THE USE OF THE AMPLIFIABLE HIGH-EXPRESSION VECTOR PEE14 TO STUDY THE
    INTERACTIONS OF AUTOANTIBODIES WITH RECOMBINANT HUMAN THYROTROPIN
    RECEPTOR
Author(s): HARFST E; JOHNSTONE AP; GOUT I; TAYLOR AH; WATERFIELD MD; NUSSEY
    SS
Corporate Source: ST GEORGE HOSP,SCH MED,DEPT CELLULAR & MOLEC SCI,CRANMER
    TERRACE/LONDON SW17 0RE//ENGLAND/; ST GEORGE HOSP,SCH MED,DEPT CELLULAR
    & MOLEC SCI,CRANMER TERRACE/LONDON SW17 0RE//ENGLAND/; UNIV COLL &
    MIDDLESEX SCH MED,LUDWIG INST CANC RES/LONDON W1P 8BT//ENGLAND/
Journal: MOLECULAR AND CELLULAR ENDOCRINOLOGY, 1992, V83, N2-3 (FEB), P
    117-123
Language: ENGLISH   Document Type: ARTICLE   (Abstract Available)

                                - end of record -
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      Display 3/3/3     (Item 1 from file: 155)

05819385   86120385
  The cloning and nucleotide sequence of cDNA for an amplified glutamine
synthetase gene from the Chinese hamster.
  Hayward BE; Hussain A; Wilson RH; Lyons A; Woodcock V; McIntosh B; Harris
TJ
  Nucleic Acids Res   Jan 24 1986,  14 (2) p999-1008,  ISSN 0305-1048
Journal Code: O8L
  Languages: ENGLISH
  Document type: JOURNAL ARTICLE

                                - end of record -
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      Display 3/3/4     (Item 2 from file: 155)
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Amplification and cloning of the Chinese hamster glutamine synthetase gene.
Sanders PG; Wilson RH
EMBO J Jan 1984, 3 (1) p65-71, ISSN 0261-4189 Journal Code: EMB
Languages: ENGLISH
Document type: JOURNAL ARTICLE

- end of record -

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Display 3/3/5 (Item 1 from file: 156)

01849550 Subfile: TOXBIB-84-158541
Amplification and cloning of the Chinese hamster glutamine synthetase gene.
Sanders PG; Wilson RH
Source: EMBO J; VOL 3, ISS 1, 1984, P65-71 ISSN: 0261-4189 Coden: EMB
Language: ENGLISH
Document Type: JOURNAL ARTICLE

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d ti,ab,cit

US PAT NO: **5,122,464** [IMAGE AVAILABLE] L1: 1 of 1
TITLE: Method for dominant selection in eucaryotic cells

ABSTRACT:

Recombinant DNA sequences which encode the complete amino acid sequence of a glutamine synthetase, vectors containing such sequences, and methods for their use, in particular as dominant selectable markers, for use in co-amplificiation of non-selected genes and in transforming host cell lines to glutamine independence.

1. **5,122,464**, Jun. 16, 1992, Method for dominant selection in eucaryotic cells; Richard H. Wilson, et al., 435/172.3, 320.1 [IMAGE AVAILABLE]

=> d from

US PAT NO: **5,122,464** [IMAGE AVAILABLE] L1: 1 of 1
DATE ISSUED: Jun. 16, 1992
TITLE: Method for dominant selection in eucaryotic cells
INVENTOR: Richard H. Wilson, Glasgow, Scotland
Christopher R. Bebbington, Windsor, England
ASSIGNEE: Celltech Limited, a British Company, Slough, England (foreign corp.)
The University Court of the University of Glasgow, Glasgow, Scotland (foreign corp.)
APPL-NO: 07/595,733
DATE FILED: Oct. 10, 1990
PCT-FILED: Jan. 23, 1987
PCT-NO: PCT/GB87/00039
371-DATE: Oct. 23, 1987
102(E)-DATE: Oct. 23, 1987
PCT-PUB-NO: WO87/04462
PCT-PUB-DATE: Jul. 30, 1987
REL-US-DATA: Continuation of Ser. No. 117,071, Oct. 23, 1987, abandoned.
FRN-PRIOR: United Kingdom 8601597 Jan. 23, 1986
INT-CL: [5] C12N 15/79; C12N 15/69
US-CL-ISSUED: 435/172.3, 320.1
US-CL-CURRENT: 435/172.3, 320.1
SEARCH-FLD: 435/172.3, 320.1, 91, 69.1; 935/33, 34
REF-CITED:

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4,399,216	8/1983	Axel et al.	435/6
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WO8606409	3/1986	World Intellectual Property Organization

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Pennica et al., Cloning & Expression of Human Tissue Type tPAcDNA in E. coli Nature 301, p. 214 1983.
Donn et al., Herbicide-resistant Alfalfa cells: an example of Gene Ampl.

Young & Ringold Mouse 3T6 Cells that Overproduce GS JBC vol. 258 #18, p. 11260 1983.
Kabak, D. et al., Bacterial (1978) vol. 134, pp. 237-245.
Velkov, Soviet Genetics (1982) vol. 18, pp. 348-396.
Kaufman, R. et al., PNAS U.S.A., vol. 83 pp. 3136-3140 (1986).
de Saint Vincent et al., Cell vol. 27, pp. 267-277 (1981).
Murray et al., Molec. and Cell. Biol., vol. 3, No. 1, pp. 32-43 (1983).
ART-UNIT: 185
PRIM-EXMR: Richard A. Schwartz
ASST-EXMR: S. L. Nolan
LEGAL-REP: Spencer, Frank & Schneider

ABSTRACT:

Recombinant DNA sequences which encode the complete amino acid sequence of a glutamine synthetase, vectors containing such sequences, and methods for their use, in particular as dominant selectable markers, for use in co-amplificiation of non-selected genes and in transforming host cell lines to glutamine independence.

22 Claims, 10 Drawing Figures

=> d clms

US PAT NO: **5,122,464** [IMAGE AVAILABLE] L1: 1 of 1

CLAIMS:

CLMS(1)

We claim:

1. A method for co-amplifying a recombinant DNA sequence which encodes the complete amino acid sequence of a desired protein other than a glutamine synthetase (GS), comprising:
(a) providing an expression vector comprising a recombinant DNA sequence which encodes an active GS enzyme and the recombinant DNA sequence which encodes the complete amino acid sequence of the desired protein other than GS;
(b) providing a eukaryotic host cell which is a GS prototroph;
(c) transforming said host cell with said expression vector; and
(d) culturing said transformed host cell under conditions which allow transformants containing an amplified number of copies of the vector-derived recombinant DNA sequence which encodes an active GS enzyme to be selected wherein said transformants also contain an amplified number of copies of the desired recombinant DNA sequence which encodes the complete amino acid sequence of the desired protein other than GS.

CLMS(2)

2. The method of claim 1, wherein step (d) comprises culturing the transformed host cell in media containing a GS inhibitor and selecting for transformant cells which are resistant to progressively increased level of the GS inhibitor.

CLMS(3)

3. The method of claim 2, wherein the GS inhibitor is selected from the group consisting of phosphinothricin and methionine sulphoximine.

CLMS(4)

4. The method of claim 2 or claim 3, wherein the media containing the GS inhibitor also contain methionine, whereby the concentrations of GS inhibitor in the media can be reduced.

CLMS(5)

5. The method of claim 4, wherein the recombinant DNA sequence which encodes an active GS enzyme is under the control of a regulatable promoter.

CLMS(6)

6. The method of claim 5, wherein the regulatable promoter is selected from the group consisting of a heat shock promoter and a metallothionein promoter.

CLMS(7)

7. The method of claim 5 or claim 6, wherein the regulatable promoter is up-regulated during the culturing and selecting steps and is down-regulated after selection.

CLMS(8)

8. The method of claim 1, wherein the desired protein is tissue plasminogen activator.

CLMS(9)

9. A method for co-amplifying a recombinant DNA sequence which encodes the complete amino acid sequence of a desired protein other than a GS, comprising:

(a) providing a first expression vector comprising a recombinant DNA sequence which encodes an active GS enzyme;

(b) providing a second expression vector comprising the recombinant DNA sequence which encodes the complete amino acid sequence of the desired protein other than GS;

(c) providing a eukaryotic host cell which is a CS prototroph;

(d) transforming said host cell with both said first and said second expression vectors; and

(e) culturing said transformed host cell under conditions which allow transformants containing an amplified number of copies of the first expression vector-derived recombinant DNA sequence which encodes an active GS enzyme to be selected, wherein said transformants also contain an amplified number of copies of the desired recombinant DNA sequence which encodes the complete amino acid sequence of a protein other than GS.

CLMS(10)

10. The method of claim 9, wherein step (e) comprises culturing the transformed host cell in media containing a GS inhibitor and selecting for transformant cells which are resistant to progressively increased of the GS inhibitor.

CLMS(11)

11. The method of claim 10, wherein the recombinant DNA sequence which encodes an active GS enzyme is under the control of a regulatable promoter.

CLMS(12)

12. The method of claim 11, wherein the regulatable promoter is selected from the group consisting of a heat shock promoter and a metallothionein promoter.

CLMS(13)

13. The method of claim 11 or claim 12, wherein the regulatable promoter is up-regulated during the culturing and selecting steps and is down-regulated after selection.

CLMS(14)

14. The method of claim 10, wherein the GS inhibitor is selected from the group consisting of phosphinothricin and methionine sulphoximine.

CLMS(15)

15. The method of claim 10 or claim 14, wherein the media containing the GS inhibitor also contain methionine, whereby the concentrations of GS inhibitor in the media can be reduced.

CLMS(16)

16. The method of claim 9, wherein the desired protein is tissue plasminogen activator.

CLMS(17)

17. The method of claim 1 or claim 9, wherein the host cell is a mammalian cell.

CLMS(18)

18. The method of claim 1 or claim 9, wherein the host cell is a CHO-K1 cell.

CLMS(19)

19. A method for using a vector as a dominant selectable marker in a cotransformation process comprising:
(a) providing an expression vector comprising a recombinant DNA sequence which encodes an active GS enzyme and a recombinant DNA sequence which encodes the complete amino acid sequence of a desired protein other than GS;
(b) providing a eukaryotic host cell which is a GS prototroph;
(c) transforming the host cell with the expression vector; and
(d) selecting transformant cells which are resistant to GS inhibitors, whereby transformant cells are selected in which the vector-derived recombinant DNA sequence which encodes an active GS enzyme serves as a dominant selectable and co-amplifiable marker.

CLMS(20)

20. A method for using a vector as a dominant selectable marker in a cotransformation process comprising:
(a) providing a first expression vector comprising a recombinant DNA sequence which encodes an active GS enzyme;
(b) providing a second expression vector comprising a recombinant DNA sequence which encodes the complete amino acid sequence of a desired protein other than GS;
(c) providing a eukaryotic host cell which is a GS prototroph;
(d) transforming said host cell with both said first and second expression vectors; and
(e) selecting transformant cells which are resistant to GS inhibitors, whereby transformant cells are selected in which the first expression vector-derived recombinant DNA sequence which encodes an active GS enzyme serves as a dominant selectable and co-amplifiable marker.

CLMS(21)

21. A plasmid including the GS minigene from plasmid pSVLGS.1.

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          1309 SYNTHETASE?
L1          42 GLUTAMINE SYNTHETASE?
               (GLUTAMI(W)SYNTHETASE?)

=> s l1 and recombinant?
          3575 RECOMBINANT?
L2          15 L1 AND RECOMBINANT?

=> s l2 and vector?
         33680 VECTOR?
L3          15 L2 AND VECTOR?

=> d ti,ab,cit,1-15

US PAT NO:      5,137,816 [IMAGE AVAILABLE]          L3: 1 of 15
TITLE:          Rhizobial diagnostic probes and rhizobium trifolii nifH
                  promoters

ABSTRACT:
This invention provides useful promoters from the R. trifolii nifH gene
for the construction of **recombinant** molecules to regulate foreign
genes for expression under desired conditions. In particular, the
promoters act to control expression of the foreign genes within root
nodules formed by rhizobial bacterial strains in symbiotic combination
with host plants.
A rhizobium diagnostic segment (RDS) is also provided comprising a DNA
segment found at more than one location in rhizobia, the RDS being
species-specific, and detectable by DNA hybridization under stringent
conditions. A **recombinant** plasmid comprising a RDS and a bacterial
strain containing the plasmid are provided. Methods are provided for
identifying species and strains of field isolates of Rhizobium, using
RDS's. One RDS exemplified comprises 5' sequences from the R. trifolii
nifH gene.

1.  5,137,816, Aug. 11, 1992, Rhizobial diagnostic probes and rhizobium
trifolii nifH promoters; Barry G. Rolfe, et al., 435/172.3, 252.2, 252.3,
320.1, 878; 536/27; 935/41, 72 [IMAGE AVAILABLE]

US PAT NO:      5,122,464 [IMAGE AVAILABLE]          L3: 2 of 15
TITLE:          Method for dominant selection in eucaryotic cells

ABSTRACT:

 **Recombinant** DNA sequences which encode the complete amino acid
sequence of a **glutamine** **synthetase**, **vectors** containing such
sequences, and methods for their use, in particular as dominant
selectable markers, for use in co-amplificiation of non-selected genes
and in transforming host cell lines to glutamine independence.

2.  5,122,464, Jun. 16, 1992, Method for dominant selection in eucaryotic
cells; Richard H. Wilson, et al., 435/172.3, 320.1 [IMAGE AVAILABLE]

US PAT NO:      5,098,838 [IMAGE AVAILABLE]          L3: 3 of 15
TITLE:          Expression of wild type and mutant **glutamine**
                  **synthetase** in foreign hosts

ABSTRACT:
The invention relates to a mutant **glutamine** **synthetase** (GS)
enzyme which is resistant to inhibition by herbicidal GS inhibitors, such
as phosphinothricin (PPT), genetic sequences coding therefor, plants
cells and prokaryotes transformed with the genetic sequences, and
herbicidal GS inhibitor-resistant plant cells and plants.

3.  5,098,838, Mar. 24, 1992, Expression of wild type and mutant
**glutamine** **synthetase** in foreign hosts; Howard Goodman, et al.,
```

[IMAGE AVAILABLE]

US PAT NO: 5,098,703 [IMAGE AVAILABLE] L3: 4 of 15
TITLE: Interferon-alpha 76

ABSTRACT:
A new polypeptide, called IFN-.alpha.76, produced by E. coli transformed with a newly isolated and characterized human IFN-.alpha. gene is described. The polypeptide exhibits interferon activities such as antiviral activity, cell growth regulation, and regulation of production of cell-produced substances.

4. 5,098,703, Mar. 24, 1992, Interferon-alpha 76; Michael A. Innis, 424/85.7; 435/69.51, 811; 530/351; 536/27 [IMAGE AVAILABLE]

US PAT NO: 5,043,270 [IMAGE AVAILABLE] L3: 5 of 15
TITLE: Intronic overexpression **vectors**

ABSTRACT:
DNA constructs are provided employing intronically positioned expression, systems, where one of the genes is a dominant gene, usually amplifiable, and the other gene encodes a sequence of interest. Higher levels of co-expression are achieved than when the genese are ligated in tandem. Specifically, the gene of interest is inserted into the intron of a DHFR minigene, the construct transformed into a mammalian cell and the resulting transformants stressed with progressively increasing levels of methotrexate. Substantially increasing levels of co-expression are achieved with increasing levels of methotrexate.

5. 5,043,270, Aug. 27, 1991, Intronic overexpression **vectors**; John M. Abrams, et al., 435/69.1, 172.3, 240.1, 320.1; 536/27; 935/34, 61, 66, 70, 71, 79, 84 [IMAGE AVAILABLE]

US PAT NO: 5,008,194 [IMAGE AVAILABLE] L3: 6 of 15
TITLE: nifH promoters of Bradyrhizobium

ABSTRACT:
The nifH promoter regions of Bradyrhizobium japonicum and Bradyrhizobium sp. (parasponia) have been sequenced and found to be significantly homologous. **Recombinant** DNA molecules comprising foreign genes under the control of such promoters are provided. Rhizobial species containing such **recombinant** constructions, either in plasmids or integrated into the genome, are provided. These are especially useful for expressing desired foreign genes within root nodules.

6. 5,008,194, Apr. 16, 1991, nifH promoters of Bradyrhizobium; Barry G. Rolfe, et al., 435/172.3, 252.2, 252.3, 320.1; 536/27; 935/6, 35, 41 [IMAGE AVAILABLE]

US PAT NO: 5,001,061 [IMAGE AVAILABLE] L3: 7 of 15
TITLE: nifD promoter of Bradyrhizobium

ABSTRACT:
The nifD promoter regions of Bradyrhizobium japonicum and Bradyhizobium sp. (Parasponia) have been sequenced and found to be significantly homologous. **Recombinant** DNA molecules comprising foreign genes under the control of such promoters are provided. Rhizobial species containing such **recombinant** constructions, either in plasmids or integrated into the genome, are provided. These are especially useful for expressing desired foreign genes within root nodules.

7. 5,001,061, Mar. 19, 1991, nifD promoter of Bradyrhizobium; Barry G. Rolfe, et al., 435/172.3, 252.2, 252.3, 320.1; 536/27; 935/6, 35, 41 [IMAGE AVAILABLE]

US PAT NO: 4,975,374 [IMAGE AVAILABLE] L3: 8 of 15

TITLE: Expression of wild type and mutant **glutamine** **synthetase** in foreign hosts

ABSTRACT:
The invention relates to a mutant **glutamine** **synthetase** (GS) enzyme which is resistant to inhibition by herbicidal GS inhibitors, such as phosphinothricin (PPT), genetic sequences coding therefor, plants cells and prokaryotes transformed with the genetic sequences, and herbicidal GS inhibitor-resistant plant cells and plants.

8. 4,975,374, Dec. 4, 1990, Expression of wild type and mutant **glutamine** **synthetase** in foreign hosts; Howard Goodman, et al., 435/172.3, 183, 252.3, 252.33; 536/27; 935/14, 29, 30, 73 [IMAGE AVAILABLE]

US PAT NO: 4,975,276 [IMAGE AVAILABLE] L3: 9 of 15
TITLE: Interferon-alpha 54

ABSTRACT:
A new polypeptide, called IFN-.alpha.54, produced by E. coli transformed with a newly isolated and characterized human IFN-.alpha. gene is described. The polypeptide exhibits interferon activities such as antiviral activity, cell growth regulation, and regulation of production of cell-produced substances.

9. 4,975,276, Dec. 4, 1990, Interferon-alpha 54; Michael A. Innis, 424/85.7, 85.4; 435/69.51, 811; 530/351 [IMAGE AVAILABLE]

US PAT NO: 4,973,479 [IMAGE AVAILABLE] L3: 10 of 15
TITLE: Interferon-.alpha.61

ABSTRACT:
A new polypeptide, called IFN-.alpha.61, produced by E. coli transformed with a newly isolated and characterized human IFN-.alpha. gene is described. The polypeptide exhibits interferon activities such as antiviral activity, cell growth regulation, and regulation of production of cell-produced substances.

10. 4,973,479, Nov. 27, 1990, Interferon-.alpha.61; Michael A. Innis, 424/85.7, 85.4; 435/69.51, 811; 530/351 [IMAGE AVAILABLE]

US PAT NO: 4,966,843 [IMAGE AVAILABLE] L3: 11 of 15
TITLE: Expression of interferon genes in Chinese hamster ovary cells

ABSTRACT:
DNA constructs are prepared which operably link human interferon genes, selective, eukaryotic marker genes, and promoter and expression control sequences for the expression of human interferon in Chinese hamster ovary (CHO) cells or progeny thereof. The human **recombinant** interferon so produced contains glycans which are a subset of the population of glycans which are contained in the native counterpart, and may be used in therapeutic formulations. The CHO cells yield high levels of human interferon with no detectable amounts of host IFN, either constitutive or inductive.

11. 4,966,843, Oct. 30, 1990, Expression of interferon genes in Chinese hamster ovary cells; Francis P. McCormick, et al., 435/69.51, 70.1, 70.3, 70.5, 172.1, 172.3, 240.2, 320.1, 811; 536/27; 935/11, 34, 70 [IMAGE AVAILABLE]

US PAT NO: 4,956,288 [IMAGE AVAILABLE] L3: 12 of 15
TITLE: Method for producing cells containing stably integrated foreign DNA at a high copy number, the cells produced by this method, and the use of these cells to produce the

ABSTRACT:
An improved method, employing electroporation, for producing novel **recombinant** host cells characterized by stably integrated foreign DNA at high copy number. These **recombinant** host cells are useful in the efficient, large-scale production of **recombinant** proteins and polypeptides.

12. 4,956,288, Sep. 11, 1990, Method for producing cells containing stably integrated foreign DNA at a high copy number, the cells produced by this method, and the use of these cells to produce the polypeptides coded for by the foreign DNA; James G. Barsoum, 435/172.3, 69.1, 70.1, 71.1, 172.1, 252.3; 935/16, 33, 52 [IMAGE AVAILABLE]

US PAT NO: 4,803,165 L3: 13 of 15
TITLE: Nif promoter of fast-growing rhizobium japonicum

ABSTRACT:
The promoter of the nifH gene of the fast-growing Rhizobium japonicum strain USDA 191, has been cloned. Over 4.2 kilobase pairs (kbp) of DNA were sequences (FIG. 1). Sequences encoding nifH and the 5'-end of nifD were identified, as were sequences involved in promoting operon transcription and a nifH ribosome binding site. Use of the nifH promoter to drive transcription in Rhizobium of heterologous structural genes is taught. Useful sequences and plasmids are also disclosed.

13. 4,803,165, Feb. 7, 1989, Nif promoter of fast-growing rhizobium japonicum; Edward R. Appelbaum, 435/172.3, 69.1, 252.2, 252.33, 320.1; 536/27; 935/29, 30, 41, 56, 64, 67, 72

US PAT NO: 4,782,022 L3: 14 of 15
TITLE: Nitrogen fixation regulator genes

ABSTRACT:
Isolation and characterization of a gene which activated nitrogen fixation genes of Rhizobium meliloti when that bacterium is in a symbiotic relationship with a plant is disclosed. This newly discovered gene, designated fix D, can activate the nifHD promoter. A method of making this inducible gene constitutive is presented. This is useful for making nifHD constitutive. The combination of the fixD promoter with heterologous structural genes is taught. Such combinations are useful for limiting expression of an encoded protein to rhizobia involved in a symbiotic relationship with a plant. Plasmids and methods useful in performance of this invention are also disclosed.

14. 4,782,022, Nov. 1, 1988, Nitrogen fixation regulator genes; Alfred Puhler, et al., 435/172.3, 252.2, 252.33, 320.1; 536/27; 930/200; 935/29, 56, 72

US PAT NO: 4,594,323 L3: 15 of 15
TITLE: Hybrid DNA conferring osmotic tolerance

ABSTRACT:
Non-conjugative episomes characterized by having a mutated proBA region are provided for conferring osmotic tolerance on osmotically sensitive hosts. The mutated DNA sequence overproduces at least one enzyme in the biosynthetic pathway for an amino acid which imparts the desired osmotic tolerance.
Cell lines E. coli CSH26 were deposited at the A.T.C.C. on Sept. 20, 1982 and given accession number 39202.

15. 4,594,323, Jun. 10, 1986, Hybrid DNA conferring osmotic tolerance; Laszlo N. Csonka, et al., 435/172.3, 107, 252.3, 320.1; 536/27; 935/14, 29, 60

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